Claims

1. A pair of oligonucleotide probes (K) comprising:
   a) a first oligonucleotide probe (P1) that comprises a first clamp section (C1), that is capable of hybridising to a second clamp section (C2) of a second oligonucleotide probe (P2), and a first target section (T1) that is capable of hybridising to a first section (S1) of a target DNA sequence (D) to be detected;
   b) a second oligonucleotide probe (P2) that comprises a second clamp section (C2), that is capable of hybridising to the first clamp section (C1) of the first oligonucleotide probe (P1), and a second target section (T2) that is capable of hybridising to a second section (S2) of the target DNA sequence (D) to be detected.

2. A pair of oligonucleotide probes according to claim 1, wherein the first and second target sections (S1, S2) are located preferably adjacent to each other on the target DNA sequence (D).

3. A pair of oligonucleotide probes according to claim 1 or 2, wherein the first and second target sections (T1, T2) are capable of being ligated to each other when hybridised to S1 and S2.

4. A pair of oligonucleotide probes according to claim 1, wherein the clamp sections (C1, C2) have melting temperature Tm_c which is higher than the melting temperature Tm_t of each of the target sections (T1, T2).

5. A pair of oligonucleotide probes according to claim 4, wherein the Tm_c of the clamp sections C1/C2 is at least 1 °C, preferably 5 °C more preferably 10 °C higher than the highest Tm_t of the two target sections T1 and T2.

6. A pair of oligonucleotide probes according to claim 1-5 wherein the GC content of clamp section ranges from more than 50 to 100%, preferably more than 60%, more preferably more than 70%, most preferably more than 80 % and is preferably in the range of 90-100%.

7. A pair of oligonucleotide probes according to claim 1-6, wherein the clamp section comprises, at least one, preferably at least one, more preferably at least 2, 3, 4 ,5 nucleotides selected from the group consisting of G's and C's, more than each of the target sections T1 or T2 of comparable length.

8. A pair of oligonucleotide probes according to claim 1-5, wherein the clamp sections C1 and/or C2 comprises nucleotides that have an increased binding affinity compared to conventional nucleotides.

9. A pair of oligonucleotide probes according to claim 1-8, wherein the clamp section comprises from 10 to 30, preferably from 15 to 25, more preferably from 18 to 24 nucleotides.

10. A pair of oligonucleotide probes according to claim 9, wherein the target sections each independently comprise from 15 to 30 preferably from 20 to 25 nucleotides.

11. A pair of oligonucleotide probes according to claim 1-10, wherein at least one of the oligonucleotide probes contains at least one primer binding site (B1, B2).

12. A pair of oligonucleotide probes according to claim 1-10, wherein the oligonucleotide probes contains at least one stuffer sequence (R1, R2).

13. A pair of oligonucleotide probes according to claim 1-10, wherein the target section (T1, T2) contains at least one allele-specific nucleotide.

14. A pair of oligonucleotide probes according to claim 13, wherein the allele-specific nucleotide is located at the end of a target section of the pair of probes.

15. A pair of oligonucleotides according to claim 13 or 14, wherein least one additional probe (P3) is provided containing a target section (T3) that contains a

further allele specific nucleotide and wherein the probe (P3) be distinguished from P1 and/or P2 .

16. A pair of oligonucleotides probes according to any of the preceding claims, wherein the first or the second probe comprises a further region that is not capable of annealing to the target nucleic acid sequence, which further region is located at the end of the first or second probe at the position of the junction site between the first and second sections of the target nucleic acid sequence.

17. A pair of oligonucleotides probes according to claim 16, wherein the further region is capable of creating a cleavage structure and whereby exposing the cleavage structure to a cleavage agent will result in cleavage of the cleavage structure when the cleavage structure and cleavage agent are incubated under conditions wherein cleavage can occur.

18. A group comprising a least two pairs of probes according to any of the claims 1-17.

19. A group according to claim 18, wherein the clamp sections C1 and C2 for each pair of probes are designed such that for each pair the combination of C1 an C2 forms a unique combination within the group such that each probe under given circumstances will selectively hybridise to one other probe in the group.

20. Group according to claim 19, wherein C1 and C2 further contain a unique sequence.

21. Method for the detection of a target nucleotide sequence (D) in a sample comprising the steps of:

- providing a pair of oligonucleotide probes (K) as defined in any one of claims 1-17 to the sample;
- allowing the probes to hybridise to the target sequence;
- optionally, providing a cleavage agent and cleaving any cleavage structure;
- ligating T1 and T2 when located adjacently on the target sequence (D); and

- detecting the presence or absence of any ligation products.

22. Method according to claim 21, wherein the ligated probes are amplified prior to detecting.

23. Method according to claim 21, wherein the target sequence is amplified prior to hybridisation of the probes.

24. Method according to claim 21-23, wherein more than one target nucleotide sequence is present (D1...Dn) in the sample to be analyzed and wherein more than one pair oligonucleotide probes (K1...Kn) are provided, corresponding to D1...Dn.

25. Method according to claim 21 wherein the clamp section C1/C2 of each pair of oligonucleotide probes (K1...Kn) contains a unique sequence as defined in claim 19.

26. Method according to any of the preceding claims wherein the probes contain a unique sequence.

27. Method according to any of the preceding claims wherein detection is based on length, sequence and/or mass.

28. Method according to any of the preceding claims wherein the target sequence is selected from the group of DNA, RNA, polyA$^+$ RNA, cDNA, genomic DNA, organellar DNA such as mitochondrial or chloroplast DNA, synthetic nucleic acids, DNA libraries, clone banks or any selection or combinations thereof.

29. Set of at least three oligonucleotides suitable for SNP genotyping, comprising:

a) a first oligonucleotide probe (P1) that comprises a first clamp section (C1) that is capable of hybridising to a second clamp section (C2) of a second oligonucleotide

probe (P2) and a first target section (T1) that is capable of hybridising to a first section (S1) of a target DNA sequence (D) to be detected;

b) a second oligonucleotide probe (P2) that comprises a second clamp section (C2) that is capable of hybridising to the first clamp section (C1) of the first oligonucleotide probe (P1) and a second target section (T2) that is capable of hybridising to a second section (S2) of the target DNA sequence (D) to be detected;

c) at least a third oligonucleotide probe (P3) that comprises the second clamp section (C2) that is capable of hybridising to the first clamp section (C1) of the first oligonucleotide probe (P1) and the second target section (T2) that is capable of hybridising to the second section (S2) of the target DNA sequence (D) to be detected;

wherein the second probe and the third probe contain an allele-specific nucleotide , preferably located at the end of a target section of the set of probes;

wherein the allele-specific nucleotide of the second and the third probes corresponds to the alleles of the SNP to be detected;

wherein the second and the third probes contains a further (stuffer) section that discriminates between the (amplified) ligation products of the first probe with the second probe and the third probe.

30. Kit comprising at least one pair of probes as defined in any of the claims 1-17.

31. Kit comprising at least one group of probes as defined in any of the claims 18-20.